

CHAPTER FIVE

ECONOMIC IMPACT ANALYSIS RESULTS

5.1 OVERVIEW OF ECONOMIC IMPACT ANALYSIS METHODOLOGY

This chapter presents the projected economic impacts of the regulatory options discussed in Chapter Three on the construction and development (C&D) industry. In this chapter, EPA evaluates the impacts of these costs using the methodology, models, data, and approaches described in Chapter Four.

The economic impact methodology uses several methods to assess economic impacts on the industry. These include models that analyze impacts at the level of the individual construction project, individual firm, national construction market, and the economy as a whole. The analysis considers impacts on C&D firms that would be complying with the regulations. It also considers the impacts on those who purchase the output of the C&D industry, including prospective new home buyers; owners of new multifamily, commercial, and industrial properties; and public entities responsible for building roads, schools, and other public facilities.

The chapter is organized as follows:

- **Section 5.2** presents EPA's analysis of the economic impacts of the proposed rule on model C&D projects. These results are based on the financial analyses developed for representative projects in Chapter Four.
- **Section 5.3** presents EPA's estimates of the national costs of the proposed rule. EPA determined those costs by multiplying the per-acre compliance costs by estimates of the number of acres subject to the proposed effluent guidelines annually.
- **Section 5.4** presents the results of EPA's analysis of the impacts of the proposed rule on model C&D establishments. This section examines the impact of the incremental compliance requirements on the financial condition of representative establishments, using data on their present financial condition as a starting point.
- **Section 5.5** presents EPA's analysis of closures and employment losses. These impacts are based on the model establishment described in Section 5.4.

- **Section 5.6** presents EPA's analysis of the proposed rule's impacts on barriers to entry—that is, how the incremental costs of the proposed rule could affect the ability of new businesses to enter the market.
- **Section 5.7** presents EPA's market model analysis. This section considers the impact of the incremental compliance requirements on national construction markets and the economy as a whole.
- **Section 5.8** presents EPA's analysis of potential impacts on government units. This section considers the various costs to government associated with the proposed rule.
- **Section 5.9** presents EPA's analysis of additional impacts of the proposed rule. This section discusses regional impacts, social costs, and unfunded mandates.

5.2 ANALYSIS OF IMPACTS ON MODEL PROJECTS

Chapter Four defines a series of model projects. In this section, EPA uses those models to analyze the impact of the proposed rule on two alternative targets: the developer-builder (assuming that they absorb the incremental costs) and the consumer (assuming that the same costs are passed on to the buyer). EPA has developed model projects for each of the following:

- A residential development of single-family homes
- A residential development of multifamily housing units
- A commercial development (enclosed shopping center)
- An industrial development (industrial park)

For each type of model project, EPA has analyzed costs and impacts for a range of project sizes: 1, 3, 7.5, 25, 70, and 200 acres. The model projects incorporate all of the baseline costs associated with developing a site and completing construction of all housing units or buildings on the site. Accordingly, it is assumed that the baseline costs include the costs of complying with existing Phase I and Phase II NPDES storm water regulations as they would apply to the site. The model then allows EPA to assess the incremental impact of additional requirements imposed under the proposed rule. Chapter Four

provides a detailed description of the model project characteristics, assumptions, and data sources, including an itemized listing of project cost elements.

5.2.1 Cost Pass Through Considerations

The model projects are calibrated to allow analysis under varying assumptions about the degree of cost pass through (CPT) from the builder-developer to the buyer.¹ Costs for the models have been estimated under two extreme assumptions, 100 percent CPT and zero CPT. Under 100 percent CPT, all incremental regulatory costs resulting from the proposed rule are passed through to end consumers. Under this approach, the costs are also assumed to be marked up to the same degree as any other project costs.² Consumers feel the impact of the regulations in the form of a higher price for each new building or housing unit. With zero CPT, the incremental regulatory costs are assumed to accrue entirely to the builder-developer, and appear as a reduction in profits. EPA determines this reduction by fixing the final sales price of the housing units and calculating the builder's profit once the regulatory costs are absorbed.

Existing literature and industry information suggests that, in the important single-family home market, at least, pass through of regulatory costs in the new housing market is close to 100 percent (e.g., Luger and Temkin, 2000), but the actual incidence of regulatory costs would depend closely on local market conditions. To illustrate the range of possible impacts, EPA has calculated its models under the extreme conditions of 100 percent and zero percent CPT. Accordingly, for each sector modeled there are two sets of results reported below.

5.2.2 Model Project Baseline Performance

Under the baseline assumptions and conditions, the sales price for each housing unit (or model commercial or industrial building) is calculated, and the baseline builder-developer profit level is

¹ Cost pass-back to the landowner is possible, but it occurs infrequently. See Section 4.1.2. Since EPA lacks data on the actual incidence and extent of cost pass-back, it is not analyzed in detail.

² The cost markup assumptions are built into the model and are explained in Chapter Four.

determined based on the sales price. Builder-developer pre-tax profit is assumed to be approximately 10 percent of the building sales price. Table 5-1 shows the baseline sales price and profit for each model project type and each project size. Data and assumptions underlying these estimates are derived in Chapter Four. The model results presented later in this section show changes from these baseline values under each regulatory option.

Table 5-1. Baseline Sales Price and Profit Conditions for the Model Projects

Project Type and Size (acres)	Calculated Building Sales Price	Builder-Developer Pre-tax Profit
<i>Single-Family Residential</i>		
1 acre	\$279,903	\$27,990
3 acres	\$283,093	\$24,251
7.5 acres	\$283,093	\$28,309
25 acres	\$282,951	\$28,295
70 acres	\$283,042	\$28,304
200 acres	\$283,058	\$28,306
<i>Multifamily Residential</i>		
1 acre	\$1,375,074	\$137,507
3 acres	\$4,125,374	\$412,537
7.5 acres	\$10,313,438	\$1,031,344
25 acres	\$34,378,235	\$3,437,823
70 acres	\$96,259,030	\$9,625,903
200 acres	\$275,025,887	\$27,502,589
<i>Commercial</i>		
1 acre	\$1,498,800	\$149,880
3 acres	\$4,496,399	\$449,640
7.5 acres	\$11,240,999	\$1,124,100
25 acres	\$37,469,920	\$3,746,992
70 acres	\$104,915,760	\$10,491,576
200 acres	\$299,759,358	\$29,975,936
<i>Industrial</i>		
1 acre	\$950,949	\$95,095
3 acres	\$2,852,899	\$285,290
7.5 acres	\$7,132,197	\$713,220
25 acres	\$23,773,989	\$2,377,399
70 acres	\$66,567,119	\$6,656,712
200 acres	\$190,191,761	\$19,019,176

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.2.3 Results of Model Project Analyses

Table 5-2a contains the results under the 100 percent CPT assumption, while Table 5-2b contains identical results under the assumption of zero CPT. In Table 5-2a (100 percent CPT), the impacts of the regulatory options are shown as the percentage increase in the sales price of each model project unit. In Table 5-2b (zero CPT), the impacts of the regulatory options are shown as the percentage decrease in builder profits.

100 Percent Cost Pass-Through

Under the *100 percent CPT* assumption, the impacts range from a minimum of 0.00 percent (i.e., there is no incremental impact on sales price) for all project types to a range of maximum impact values (where the percent listed indicates an increase in sales price of that amount): 0.09 percent for single-family residential, 0.05 percent for multifamily residential, 0.05 percent for commercial, and 0.07 percent for industrial. All of the maximum impacts occur under Option 2.

Zero Cost Pass-Through

Under the *zero CPT* assumption, the impacts range from a minimum of 0.00 percent for all project types under various option combinations (indicating no impact to builder profit) to a range of maximum impact values, all under one percent. Maximum impacts all occur with Option 2 as shown below:

- Single-family residential: -0.80 percent
- Multifamily residential: -0.45 percent
- Commercial: -0.41 percent
- Industrial: -0.64 percent

Table 5-2a. Impact of Regulatory Options on Model Project Financials—100 Percent Cost Pass Through, All Project Sizes

Option	Percent Change in Project Price to Buyer							
	Single-Family		Multifamily		Commercial		Industrial	
	Min	Max	Min	Max	Min	Max	Min	Max
1	0.00%	0.04%	0.00%	0.02%	0.00%	0.02%	0.00%	0.03%
2	0.00%	0.09%	0.00%	0.05%	0.00%	0.05%	0.00%	0.07%
3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Source: EPA estimates based on the methodologies presented in Chapter Four.

Table 5-2b. Impact of Regulatory Options on Model Project Financials—Zero Percent Cost Pass Through, All Project Sizes

Option	Percent Change in Builder-Developer Profit							
	Single-Family		Multifamily		Commercial		Industrial	
	Min	Max	Min	Max	Min	Max	Min	Max
1	0.00%	-0.37%	0.00%	-0.19%	0.00%	-0.17%	0.00%	-0.27%
2	0.00%	-0.80%	0.00%	-0.45%	0.00%	-0.41%	0.00%	-0.64%
3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.2.4 Nonbuilding Project Analysis Results

This section presents the results of the model nonbuilding project analysis described in Section 4.2.7. As indicated in that section, EPA has not developed actual engineering costs for projects such as roads and highways. As a result, EPA has simulated the impact of the proposed rule on such projects using worst-case (i.e., highest) estimates of the per-acre engineering costs estimated for building projects.

Due to the lack of engineering costs for this project type, EPA used a “worst-case” assumption of \$378 per acre in compliance costs. This figure is based on the highest per-acre compliance cost

estimated for a 7.5-acre building project. EPA elected to use the compliance costs for a 7.5-acre project because the model one-mile new highway construction project encompasses 10.67 acres. EPA estimates that the baseline costs of construction for one mile of typical road or highway is \$5.4 million (see Section 4.2.7). Using \$378 per acre, the worst-case estimate of compliance costs associated with one mile of new road or highway construction (10.67 acres) is \$4,033. This equates to less than 0.1 percent of baseline costs, indicating even under worst-case assumptions regarding compliance costs, the proposed rule is unlikely to have a significant impact on representative nonbuilding construction projects.

5.3 ANALYSIS OF NATIONAL COMPLIANCE COSTS

EPA has calculated the national compliance costs associated with the proposed rule by multiplying the compliance costs per acre (by project type and size) by estimates of the number of acres developed per year. EPA used data from the USDA National Resources Inventory (NRI) to estimate the number of acres developed per year. According to this source, approximately 2.2 million acres of undeveloped land are converted to a developed state every year. EPA has adjusted this total to account for waivers and differences in regulatory coverage between Option 1 and Option 2.³ As described in Chapter Four, both the 14-Community Study (conducted in support of the Phase II NPDES storm water rule development) and building permits data from Census were used to allocate the developed acreage by project type and size.

Table 5-3 contains EPA's estimates of the national costs of the regulatory options. The national costs of the proposed rule range from \$0.00 for each project type (Option 3) to a maximum of \$121.5 million for single-family residential construction, \$59.4 million for multifamily residential construction, \$277.3 million for commercial construction, and \$11.0 million for industrial construction (all Option 2).

The combined national compliance costs across all sectors are shown in the final rows of Table 5-3a. The national compliance costs under Option 1 are \$118.1 million while the national compliance costs under Option 2 are \$469.2 million.

³ Option 1 applies to sites of one acre or more in size while Option 2 applies to sites of five acres or more in size.

Table 5-3a. Estimated National Cost of Storm Water Control Options
(All Dollar Amounts in Constant, Pre-tax, 1997 Dollars)

Option	Compliance Costs per Acre(\$)	Estimated National Costs (\$ Millions)
<i>Single-Family Residential</i>		
Option 1	\$57.0	\$24.1
Option 2	\$305.0	\$121.5
Option 3	\$0.0	\$0.0
<i>Multifamily Residential</i>		
Option 1	\$59.0	\$11.9
Option 2	\$319.0	\$59.4
Option 3	\$0.0	\$0.0
<i>Commercial</i>		
Option 1	\$74.0	\$78.4
Option 2	\$312.0	\$277.3
Option 3	\$0.0	\$0.0
<i>Industrial</i>		
Option 1	\$81.0	\$3.7
Option 2	\$303.0	\$11.0
Option 3	\$0.0	\$0.0
Total		
Option 1	--	\$118.1
Option 2	--	\$469.2
Option 3	--	\$0.0

NOTE: Compliance costs per acre are weighted national averages for each option over all site size classes.

Source: EPA estimates based on the methodologies presented in Chapter Four.

Table 5-3b. Calculation of Total Cost per Unit
(All Dollar Amounts Are in Constant, Pre-tax, 1997 Dollars)

	Single	Multi-Family	Commercial	Industrial	Total
Option 1					
Total Costs	\$24,099,340	\$11,892,936	\$78,415,033	\$3,733,824	\$118,141,133
Total Acres	533,878	252,182	1,332,476	57,523	2,176,058
Cost per Acre	\$45.14	\$47.16	\$58.85	\$64.91	
Units per Acre	2.67	13,591	8,320	8,555	
Cost per Unit	\$16.91/house	\$0.003/sq ft	\$0.007/sq ft	\$0.008/sq ft	
Option 2					
Total Costs	\$121,470,785	\$59,391,699	\$277,280,636	\$11,016,368	\$469,159,488
Total Acres	501,100	229,958	1,061,108	42,733	1,834,898
Cost per Acre	\$242.41	\$258.27	\$261.31	\$257.80	
Units per Acre	2.67	13,591	8,320	8,555	
Cost per Unit	\$90.79/house	\$0.019/sq ft	\$0.031/sq ft	\$0.030/sq ft	

Source: EPA estimates based on the methodologies presented in Chapter Four.

Table 5-3b shows the calculation of cost per unit for Options 1 and 2. Units are “dollars per house” for single-family residential construction and “dollars per square foot” for all other categories. Total costs are the estimated national costs as shown in Table 5-3a. Option 2 applies only to sites disturbing 5 acres or more, so this option encompasses less acreage than Option 1. In addition, several states have enacted regulations equivalent to the proposed standards and so would not incur incremental costs from the proposed rule. These equivalent states are included in the storm water control costs per acre in Table 5-3a but removed in the estimated national costs in the same table. Table 5-3b recalculates the cost per acre with the costs attributable to states with equivalent programs removed. With this adjustment, the cost per unit is calculated by dividing by the number of houses per acre, or number of rentable square feet per acre, which is derived from Census and R. S. Means data.

The cost to build a new single-family home increases by \$17 under Option 1 and \$91 under Option 2. Costs per square foot increase by less than 1 cent for Option 1 and 2 to 3 cents for Option 2. The impacts of these cost increases on the markets for new construction are explored in Section 5.7.

5.4 ANALYSIS OF IMPACTS ON MODEL ESTABLISHMENTS

As described in Chapter Four, EPA developed a set of representative model projects as one basis for analyzing the impacts of the proposed rule on the construction industry. EPA has examined the impacts of the compliance costs associated with these model projects on a series of model establishments that characterize the financial conditions of “typical” businesses in each of the four major industry sectors (single-family residential, multifamily residential, commercial, and industrial; see Section 4.3).

The model firm analysis simulates the impact of the incremental compliance costs on the balance sheet and cash flow of the model establishments, and expresses the impacts in terms of changes in meaningful business financial ratios. The ratios used in the analysis include:

- Gross profit ratio
- Return on net worth
- Current ratio
- Debt to equity ratio

These ratios are reviewed in Chapter Four, which also presents a discussion of their significance as indicators of financial performance.

5.4.1 Building Construction

This section presents the results of simulations of firm performance under the regulatory options being considered by EPA. As indicated in Chapter Four, the simulations have been run under two CPT scenarios: (1) zero CPT from the developer-builder to the consumer and (2) an estimated actual CPT, where a “realistic” share of the compliance costs are passed through to consumers in the form of higher prices. EPA has estimated a separate CPT factor for each market sector individually. The zero CPT results presented in this section represents the “worst case” scenario; impacts under the more realistic CPT assumption are much smaller than those shown below.

Table 5-4 shows sample results for a firm in the single-family residential construction industry (SIC 1531) completing between 10 and 24 housing starts per year, based on costs for 7.5-acre projects. Impacts are most severe on the return on net worth ratio, a recurring outcome throughout EPA's model firm analysis. Return on net worth is the most sensitive ratio because it is based on net profit after taxes, which makes up 1.2 percent of revenues for the "typical" establishment in SIC 1531 according to D&B data. Impacts are much less severe under the other financial ratio measures.

Table 5-5a provides a summary of the results for each sector by regulatory option, over all project sizes and under the zero CPT scenario. The results are broadly similar to the detailed example presented in Table 5-4 for the single-family residential sector. Table 5-5b provides the same summary of financial ratios under the estimated actual cost pass through scenario. In both scenarios the most severe impacts are observed when measured by impact on return on net worth, followed by the gross profit, debt to equity, and current ratios. The largest impact over both scenarios is a 5.85 percent decline in the return on net worth ratio for the single-family residential sector under Option 2 with zero CPT. With the exception of return on net worth, the remainder of the results under zero CPT are at or below 1.0 percent for all project types. The results under the estimated actual CPT scenario indicate impacts of less than 1.0 percent for all financial ratios and all four project types, with most of the impacts being less than 0.10 percent (with the exception of return on net worth).

**Table 5-4 Impact of Regulatory Options on Financial Performance for Model Firm
Single-family Residential Construction, 10-24 Housing Units Starts Class**

Impact	Regulatory Option		
	Option 1	Option 2	Option 3
<i>Cost Impact</i>			
Incremental Costs per Acre Per Year	\$64	\$371	\$0
Incremental Costs per Establishment Per Year	\$354	\$2,034	\$0
<i>Impact on Financial Performance</i>			
Gross Profit Ratio	0.2278%	0.2270%	0.2280%
Percent change from baseline	-0.0780%	-0.4490%	--
Return on Net Worth	0.0502%	0.0481%	0.0506%
Percent change from baseline	-0.8810%	-5.0680%	--
Current Ratio	1.3935%	1.3930%	1.3936%
Percent change from baseline	-0.0070%	-0.0400%	--
Debt to Equity Ratio	1.9161%	1.9189%	1.9155%
Percent change from baseline	0.0310%	0.1800%	--

Source: EPA estimates based on the methodologies presented in Chapter Four.

Table 5-5a. Impact of Regulatory Options on Model Firm Financial Performance
Zero Cost Pass Through

Construction Industry and Regulatory Option	Percent Change in Financial Ratios, From Baseline ^a							
	Gross Profit		Return on Net Worth		Current Ratio		Debt to Equity	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
<i>Single-family residential</i>								
Option 1	0.000%	-0.230%	0.000%	-2.540%	0.000%	-0.020%	0.000%	0.900%
Option 2	0.000%	-0.520%	0.000%	-5.850%	0.000%	-0.050%	0.000%	0.210%
Option 3	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
<i>Multifamily residential</i>								
Option 1	0.000%	-0.310%	0.000%	-0.990%	0.000%	-0.050%	0.000%	0.200%
Option 2	0.000%	-0.950%	0.000%	-3.070%	0.000%	-0.160%	0.000%	0.640%
Option 3	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
<i>Commercial</i>								
Option 1	0.000%	-0.170%	0.000%	-0.530%	0.000%	-0.020%	0.000%	0.130%
Option 2	0.000%	-0.400%	0.000%	-1.250%	0.000%	-0.050%	0.000%	0.310%
Option 3	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
<i>Industrial</i>								
Option 1	0.000%	-0.140%	0.000%	-0.430%	0.000%	-0.020%	0.000%	0.120%
Option 2	0.000%	-0.320%	0.000%	-1.020%	0.000%	-0.050%	0.000%	0.280%
Option 3	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%

^a Ranges (minimum and maximum) reflect results across model firms of varying sizes.

Source: EPA estimates based on the methodologies presented in Chapter Four.

**Table 5-5b. Impact of Regulatory Options on Model Firm Financial Performance
Estimated Actual Cost Pass Through**

Construction Industry and Regulatory Option	Percent Change in Financial Ratios, From Baseline ^a							
	Gross Profit		Return on Net Worth		Current Ratio		Debt to Equity	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
<i>Single-family residential</i>								
Option 1	0.000%	-0.034%	0.000%	-0.379%	0.000%	-0.003%	0.000%	0.013%
Option 2	0.000%	-0.077%	0.000%	-0.872%	0.000%	-0.007%	0.000%	0.031%
Option 3	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
<i>Multifamily residential</i>								
Option 1	0.000%	-0.026%	0.000%	-0.083%	0.000%	-0.004%	0.000%	0.017%
Option 2	0.000%	-0.080%	0.000%	-0.259%	0.000%	-0.014%	0.000%	0.054%
Option 3	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
<i>Commercial</i>								
Option 1	0.000%	-0.017%	0.000%	-0.054%	0.000%	-0.002%	0.000%	0.013%
Option 2	0.000%	-0.040%	0.000%	-0.126%	0.000%	-0.006%	0.000%	0.031%
Option 3	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
<i>Industrial</i>								
Option 1	0.000%	-0.021%	0.000%	-0.066%	0.000%	-0.003%	0.000%	0.018%
Option 2	0.000%	-0.048%	0.000%	-0.155%	0.000%	-0.008%	0.000%	0.042%
Option 3	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%

^a EPA applied the following estimated cost pass through factors: Single-family residential, 85.10%; Multifamily residential, 91.55%; Commercial, 89.87%; Industrial, 84.75%.

^b Ranges (minimum and maximum) reflect results across model firms of varying sizes.

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.4.2 Nonbuilding Construction

EPA has analyzed the potential impacts of the proposed rule on nonbuilding construction establishments based on Census data and the cost data presented in Section 5.2.4. As previously discussed, this analysis focuses on highway and street construction contractors (NAICS 23411) due to the lack of financial data for other segments of the heavy construction industry group (NAICS 234).

The model establishment analysis for heavy construction, although somewhat simplified, follows the basic methodology outlined in Section 4.3 for establishments in the commercial and industrial construction industries. EPA has determined that the median highway construction establishment (NAICS 23411), based on revenues, is in the 50 to 99 employee size classification category as defined by Census (U.S. Census 2000). Within this employment size class, EPA calculated average establishment revenues, employment, and costs as discussed in Section 4.3.1.2.

For the model establishment, EPA examined the economic impacts of the worst-case compliance cost impacts on the same four financial ratios analyzed above for the residential, commercial, and industrial construction industries. Due to the lack of actual engineering cost estimates for highway construction, the compliance costs used in this analysis do not correspond to a particular regulatory option or combination of options. Compliance costs for 7.5-acre projects were chosen for this analysis because they are closest in size to the model highway construction project assumed to be undertaken by the model establishment, which encompasses 10.67 acres.

Table 5-6 shows the results of this analysis for the model highway construction firm (50-99 employment size class). Overall, the impacts are not large, with only one estimate above one-quarter of one percent. As with the model establishments in the building construction industries, the impacts are largest for the return on net worth ratio.

Table 5-6. Impact of Proposed Rule on Model Firm Financials - Highway Construction

Cost Pass Through Assumption	Gross Profit		Return on Net Worth		Current		Debt to Equity	
	Ratio	Percent Change from Baseline	Ratio	Percent Change from Baseline	Ratio	Percent Change from Baseline	Ratio	Percent Change from Baseline
Zero Cost Pass Through								
Baseline	0.223000	--	0.198344	--	1.629629	--	1.061856	--
Worst-Case	0.222256	-0.33%	0.196307	-1.03%	1.628681	-0.06%	1.064601	0.26%
90 Percent Cost Pass Through								
Baseline	0.223000	--	0.198344	--	1.629629	--	1.061856	--
Worst-Case	0.222926	-0.03%	0.198141	-0.10%	1.629534	-0.01%	1.062131	0.03%

Source: EPA estimates based on the methodologies presented in Chapter Four.

Under a zero cost pass through (CPT) assumption, the largest impact is on return on net worth, which declines by just over 1.0 percent. Impacts under an estimated CPT value of 90 percent are all at or below 0.10 percent.

5.5 ANALYSIS OF IMPACTS ON CLOSURES AND EMPLOYMENT LOSSES

As discussed in Chapter Four, EPA used two approaches to estimate potential facility closures and employment losses resulting from the proposed rule. The primary approach was to analyze changes in key financial ratios that occur as firms' costs increase in response to the proposed rule. To estimate closures, EPA examined a weighted average of changes in the current ratio, debt to equity ratio, and return on net worth ratios. EPA then constructed a cumulative distribution function for each ratio to estimate the percent of establishments that would likely fall below "critical" values after incurring compliance costs. That percent falling below this critical value, multiplied by the number of facilities represented by the model under evaluation, resulted in a projected number of closures. Employment losses were calculated by multiplying the number of establishments projected to close by employment estimates for the model facility representing those closures.

EPA's alternative approach, which analyzed estimated model facility cash flow, was used as a check on the financial ratio analysis described above. Results from this analysis are contained in Appendix 5-A.

5.5.1 Facility Closures

Table 5-7a shows closure analysis results using the financial ratio method under a zero CPT assumption — the worst case scenario. Results under a calculated CPT assumption are presented in Table 5-7b. The largest number of establishment closures is projected to occur in the commercial sector (43 projected closures), followed by the single-family residential sector (13 closures). Facility closures as a percent of total facilities are less than one percent under all proposed options and for all industry sectors. As seen in Table 5-7b, closure impacts are even smaller when CPT is accounted for.

**Table 5-7a. Estimated Facility Closures
Zero Cost Pass Through**

Option	Single-Family		Multifamily		Commercial	
	Number	Pct. of Total	Number	Pct. of Total	Number	Pct. of Total
1	4	0.005%	1	0.022%	11	0.028%
2	13	0.015%	3	0.065%	43	0.108%
3	0	0.000%	0	0.000%	0	0.000%
Option	Industrial		Heavy		TOTAL	
	Number	Pct. of Total	Number	Pct. of Total	Number	Pct. of Total
1	2	0.026%	0	0.000%	18	0.012%
2	7	0.090%	26	0.230%	92	0.063%
3	0	0.000%	0	0.000%	0	0.000%

Source: EPA estimates based on the methodologies presented in Chapter Four.

**Table 5-7b. Estimated Facility Closures
Estimated Cost Pass Through**

Option	Single-Family		Multifamily		Commercial	
	Number	Pct. of Total	Number	Pct. of Total	Number	Pct. of Total
1	1	0.001%	0	0.000%	1	0.003%
2	2	0.002%	0	0.000%	4	0.010%
3	0	0.000%	0	0.000%	0	0.000%
Option	Industrial		Heavy		TOTAL	
	Number	Pct. of Total	Number	Pct. of Total	Number	Pct. of Total
1	0	0.000%	0	0.000%	2	0.001%
2	1	0.013%	3	0.027%	10	0.007%
3	0	0.000%	0	0.000%	0	0.000%

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.5.2 Employment Losses

Table 5-8a presents employment loss analysis results for the financial ratio method under a zero CPT assumption to show the worst case scenario. Results under a calculated CPT assumption are presented in Table 5-8b.

Employment impacts as a percent of each sector's total employment are roughly the same as closure impacts. This is to be expected, because EPA estimated employment impacts by multiplying projected closures by the number of employees per establishment. Note that in the multifamily sector, the percentage of employment losses is slightly larger than the percentage of closures. This is because the model establishments most affected by the proposed rule account for a disproportionately high percentage of sector employment.

**Table 5-8a. Estimated Employment Losses
Zero Cost Pass Through**

Option	Single-Family		Multifamily		Commercial	
	Number	Pct. of Total	Number	Pct. of Total	Number	Pct. of Total
1	34	0.016%	12	0.034%	162	0.029%
2	145	0.067%	61	0.173%	603	0.110%
3	0	0.000%	0	0.000%	0	0.000%
Option	Industrial		Heavy		TOTAL	
	Number	Pct. of Total	Number	Pct. of Total	Number	Pct. of Total
1	43	0.029%	0	0.000%	251	0.021%
2	133	0.089%	647	0.233%	1,589	0.130%
3	0	0.000%	0	0.000%	0	0.000%

Source: EPA estimates based on the methodologies presented in Chapter Four.

**Table 5-8b. Estimated Employment Losses
Estimated Cost Pass Through**

Option	Single-Family		Multifamily		Commercial	
	Number	Pct. of Total	Number	Pct. of Total	Number	Pct. of Total
1	5	0.001%	1	0.003%	16	0.003%
2	22	0.006%	5	0.014%	61	0.011%
3	0	0.000%	0	0.000%	0	0.000%
Option	Industrial		Heavy		TOTAL	
	Number	Pct. of Total	Number	Pct. of Total	Number	Pct. of Total
1	7	0.005%	0	0.000%	29	
2	20	0.013%	65	0.023%	173	
3	0	0.000%	0	0.000%	0	

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.6 ANALYSIS OF BARRIER TO ENTRY

This section presents the results of EPA's barrier to entry analysis. As discussed in Section 4.3.3, EPA examined the ratio of compliance costs to current and total assets to determine if new market entrants would find it more difficult to obtain construction loans to start a project than would existing firms. As discussed in more detail in that section, this methodology is conservative by design because it does not account for the fact that a firm would typically be expected to finance 20 percent of the incremental compliance costs to obtain the loan— not the full amount as assumed here.

5.6.1 Building Construction

As shown in Table 5-9a, compliance costs represent a maximum of 0.82 percent of a model establishment's current assets (0.60 percent of total assets) across all options and project types. These maximum projected impacts occur in the multifamily sector. For the industrial and commercial sectors, compliance costs are less than 0.30 percent of current assets, while in the single-family sector, costs are less than 0.25 percent of current assets. Table 5-9b shows the barrier to entry analysis results under an estimated CPT scenario. As shown, the impacts are smaller than under the zero CPT scenario, with the maximum impact on both current assets and total assets at less than 0.10 percent.

Table 5-9a. Barrier to Entry Analysis—Zero Cost Pass Through

Option	Compliance Costs Divided by:			
	Current Assets		Total Assets	
	Min	Max	Min	Max
<i>Single-Family Residential</i>				
1	0.000%	0.100%	0.000%	0.070%
2	0.000%	0.230%	0.000%	0.170%
3	0.000%	0.000%	0.000%	0.000%
<i>Multifamily Residential</i>				
1	0.000%	0.260%	0.000%	0.190%
2	0.000%	0.820%	0.000%	0.600%
3	0.000%	0.000%	0.000%	0.000%
<i>Commercial</i>				
1	0.000%	0.120%	0.000%	0.090%
2	0.000%	0.270%	0.000%	0.220%
3	0.000%	0.000%	0.000%	0.000%
<i>Industrial</i>				
1	0.000%	0.110%	0.000%	0.080%
2	0.000%	0.250%	0.000%	0.190%
	0.000%	0.000%	0.000%	0.000%

Source: EPA estimates based on the methodologies presented in Chapter Four.

Table 5-9b. Barrier to Entry Analysis—Cost Pass Through

Option	Compliance Costs Divided by:			
	Current Assets		Total Assets	
	Min	Max	Min	Max
Single-Family Residential				
1	0.000%	0.015%	0.000%	0.011%
2	0.000%	0.034%	0.000%	0.025%
3	0.000%	0.000%	0.000%	0.000%
Multifamily Residential				
1	0.000%	0.022%	0.000%	0.016%
2	0.000%	0.069%	0.000%	0.050%
3	0.000%	0.000%	0.000%	0.000%
Commercial				
1	0.000%	0.012%	0.000%	0.009%
2	0.000%	0.028%	0.000%	0.022%
3	0.000%	0.000%	0.000%	0.000%
Industrial				
1	0.000%	0.016%	0.000%	0.013%
2	0.000%	0.038%	0.000%	0.029%
3	0.000%	0.000%	0.000%	0.000%

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.6.2 Nonbuilding Construction

The barrier to entry analysis also produced results in line with the results previously reported for the other four industries. Table 5-10 shows the results of this analysis. Under a zero CPT assumption, compliance costs are less than one percent of both current and total assets using the best estimate compliance cost. Using the worst-case estimate, compliance costs are slightly above 2.5 percent of current assets and nearly 1.5 percent of total assets. With cost pass through, these impacts are significantly lower.

Table 5-10. Barrier to Entry Analysis - Highway Construction

Compliance Cost Assumption	Compliance Costs Divided By:	
	Current Assets	Total Assets
<i>Zero Cost Pass Through</i>		
Baseline	0.00%	0.00%
Worst-Case	0.29%	0.17%
<i>With 90 Percent Cost Pass Through</i>		
Baseline	0.00%	0.00%
Worst-Case	0.03%	0.02%

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.7 ANALYSIS OF IMPACTS ON NATIONAL CONSTRUCTION MARKETS

EPA used three approaches to estimate the potential impacts of the regulatory options on the national single-family housing construction market. This section presents the results of these analyses.

In the first approach, EPA analyzed the impacts of the proposed rule on consumers under the assumption that developers and builders pass on 100 percent of the costs to the new single-family home buyer. To assess these impacts, EPA developed a model that estimates the change in income needed to qualify for financing to purchase the (higher priced) housing unit, and then estimates the change in the number of households that would meet the higher income criteria. In theory, this provides an estimate of the change in new housing demand that could arise as a result of the proposed regulations.

EPA's second approach applies a partial equilibrium model to 220 metropolitan housing markets to estimate how compliance costs change the proportion of homes in the market that the median income household can afford, termed the Housing Opportunity Index (HOI). HOI is published quarterly by the NAHB. This index offers a similar estimate of the change in housing demand that may arise from the effluent guideline in terms of a familiar, widely publicized, indicator.

The third approach is a single national partial equilibrium model. Changes in prices and quantities from this model are used to derive the impacts on employment and social welfare.

EPA's methodology for these models is discussed more fully in Section 4.5.

5.7.1 Residential Construction Markets

5.7.1.1 Housing Affordability

Table 5-11 shows that the incremental costs of the proposed rule add a maximum of \$58 to the \$82,472 in income that is required to purchase the baseline model home. After this income change, between 5,200 and 29,000 households (0.03 percent to 0.15 percent of total qualifying households) would fail to qualify for a mortgage.

Table 5-11. Impact of Erosion and Sediment Control Costs on Housing Affordability
(All Dollar Amounts are in Constant, Pre-tax, 1997 Dollars)

Option	ESC Costs (\$/Unit)	Total Change in Costs (\$/Unit)	Income Needed To Qualify (\$)	Change in Income Needed (\$)	Number of Households Shifted (Thousands)	Percent of Households Shifted That Could Afford Baseline (Percent)
1	\$20	\$36	\$82,482	\$10	-5.2	-0.03%
2	\$111	\$201	\$82,529	\$58	-29.1	-0.15%
3	\$0	\$0	\$82,472			

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.7.1.2 Housing Opportunity Index

The HOI is an alternative measure of housing affordability. EPA estimated the change in HOI from its baseline value for 220 regional housing markets. Table 5-12 summarizes these results in terms

of the average change calculated across each Census Bureau division. Since the HOI encompasses both existing and new housing, the results show the net effect for the entire housing market. The value of the HOI varies considerably by region. In the Pacific region, high real estate prices result in only one third of households having sufficient income to purchase the median-priced home. In the central regions, however, three-quarters of households can afford the median-priced home.

The proposed regulation has little effect on regional HOI. Table 5-13 shows the percentage change in HOI by Census division. Option 1 changes HOI by less than two-hundredths of one percent in all regions. Option 2 changes HOI by less than 0.2 percent. The largest changes occur in the South Atlantic region. These changes are much smaller in scale than annual changes that result from normal shifts in real estate market conditions and demography of the market areas.

Table 5-12. Single-Family Residential Average HOI by Census Division

Option	Census Division								
	1 New England	2 Middle Atlantic	3 East North Central	4 West North Central	5 South Atlantic	6 East South Central	7 West South Central	8 Mountain	9 Pacific
1	54.24	62.36	72.66	78.81	70.30	69.69	64.73	44.57	32.62
2	54.23	62.31	72.59	78.74	70.24	69.65	64.69	44.55	32.61
3	54.24	62.37	72.67	78.82	70.31	69.70	64.73	44.58	32.63

HOI indicates the percent of households in each region that can afford the median-priced house.

Source: EPA estimates based on the methodologies presented in Chapter Four.

Table 5-13. Single-Family Residential Percentage Change in HOI by Census Division

Option	Census Division								
	1 New England	2 Middle Atlantic	3 East North Central	4 West North Central	5 South Atlantic	6 East South Central	7 West South Central	8 Mountain	9 Pacific
1	0.00%	-0.02%	-0.02%	-0.02%	-0.02%	-0.01%	-0.01%	-0.01%	-0.01%
2	-0.02%	-0.10%	-0.10%	-0.10%	-0.11%	-0.08%	-0.07%	-0.07%	-0.04%
3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

HOI indicates the percent of households in each region that can afford the median-priced house.

Source EPA estimates based on the methodologies presented in Chapter Four.

5.7.1.3 Single-Family Housing Prices and Quantities

Table 5-14 shows the results of EPA's analysis using the market model approach. The table shows the estimated changes in median single-family home prices from all combinations of the proposed options. The changes in costs range from \$0 to \$111. The market model recognizes that market conditions control how much of these costs can be passed through to consumers. Thus, the price increase is somewhat smaller than the related cost increase, reflecting the fact some costs would be borne by the builder-developer. The largest increase in price reduces the quantity that can be sold by about two-hundredths of one percent. The total loss in output to the construction industry ranges from \$0 to \$72 million.

Table 5-14. Single-Family Residential—Changes in Price and Quantity From the Baseline
(All Dollar Values Are in Constant, Pre-tax, 1997 Dollars)

Option	Change in Cost (\$/Unit)	New Price (\$/Unit)	Price Change (\$/Unit)	Quantity Change (Units)	Quantity Change (Percent)	Loss of Output (\$ Million)
1	\$20	\$288,414	\$17	(44)	-0.00%	-\$12.8
2	\$111	\$288,492	\$95	(248)	-0.02%	-\$71.6
3	\$0	\$288,397	\$0	0	-0.00%	0

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.7.1.4 Multifamily Housing Prices and Quantities

Table 5-15 shows the estimated changes in median price of a unit in a multifamily building from the proposed options. The changes in costs range from \$0 to \$40 per unit. Multifamily housing disturbs a smaller area per unit, so any ESC-related costs are spread over more units. The market model suggests a higher share of compliance costs in multifamily housing would be passed through to consumers, compared to single-family homes, so price changes are closer to the actual change in builder costs. The price changes passed through to consumers range from \$0 to \$40 per unit.

**Table 5-15. Multifamily Residential—Changes in Price and Quantity From the Baseline
(All Dollar Values Are in Constant, Pre-tax, 1997 Dollars)**

Option	Change in Cost (\$/Unit)	New Price (\$ 1,000/Unit)	Price Change (\$/Unit)	Quantity Change (Units)	Quantity Change (Percent)	Loss of Output (\$ Million)
1	\$7	\$132.53	\$7	-7	0.00%	-\$0.9
2	\$40	\$132.57	\$40	-41	0.01%	-\$5.2
3	\$0	\$132.53	\$0	0	0.00%	-\$0.0

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.7.2 Non-Residential Construction Markets

5.7.2.1 Commercial Space

Rental prices for commercial space are typically quoted in dollars per square foot per year. Table 5-16 shows the estimated changes in median rental rate of a square foot of commercial space from the proposed options. The changes in costs range from \$0 to \$0.02 per square foot. Tenants of commercial space are considerably more price sensitive than residential buyers, so less of the change in costs can be passed through to tenants. The change in average price per square foot reflects this absorption of compliance costs by builders and building owners.

Price changes range from \$0 to \$0.02 per square foot. Quantity reductions are estimated to reach seven-hundredths of one percent for the most costly option. The total loss in output to the construction industry ranges from \$0 to \$67.1 million.

**Table 5-16. Commercial—Changes in Price and Quantity From the Baseline
(All Dollar Values Are in Constant, Pre-tax, 1997 Dollars)**

Option	Change in Cost (\$/Sq. Ft.)	New Price (\$/Sq. Ft.)	Price Change (\$/Sq. Ft.)	Quantity Change (Units)	Quantity Change (Percent)	Loss of Output (\$ Million)
1	\$0.01	\$14.67	\$0.00	-36	-0.01%	-\$14.7
2	\$0.02	\$14.69	\$0.02	-163	-0.07%	-\$67.1
3	\$0.00	\$14.66	\$0.00	0	-0.00%	\$0.0

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.7.2.2 Industrial Space

Only 12,100 industrial projects are estimated to start in the base year. Rental prices for industrial space are typically quoted in dollars per square foot per year. Table 5-17 shows the estimated changes in median rental rate of a square foot of industrial/warehouse space from the proposed options. The changes in costs range from \$0 to \$0.02 per square foot. Buyers of industrial space are considerably more price sensitive than homeowners, so less of the change in costs can be passed through to the end-users. The change in average price per square foot reflects this absorption of compliance costs by builders and developers.

Price changes range from \$0 to \$0.02 per square foot. Quantity reductions are estimated to reach 0.3 percent for the most costly option, albeit on a small number of projects in the baseline. The total loss in output to the construction industry ranges from \$0 to \$17.8 million.

**Table 5-17. Industrial—Changes in Price and Quantity From the Baseline
(All Dollar Values Are in Constant, Pre-tax, 1997 Dollars)**

Option	Change in Cost (\$/Sq. Ft.)	New Price (\$/Sq. Ft.)	Price Change (\$/Sq. Ft.)	Quantity Change (Units)	Quantity Change (Percent)	Loss of Output (\$ Million)
1	\$0.01	\$5.17	\$0.00	-11	-0.08%	-\$4.4
2	\$0.02	\$5.18	\$0.02	-46	-0.32%	-\$17.8
3	\$0.00	\$5.16	\$0.00	0	0.00%	\$0.0

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.7.3 Output and Employment

As discussed in Section 4.5, additional compliance costs reduce the output of the construction industry as the increased price reduces sales. The estimate of this effect is shown in the “Loss of Output” column of Table 5-18. Most of the losses are in the large single-family residential and catch-all commercial construction sectors. These losses are offset, however, by increases in output and employment in those industries associated with compliance, i.e., design, installation, and inspection of ESCs. The estimate of the amount of new work generated in these activities is shown in the “Stimulus from Added Work” column. The next two columns show the changes in jobs related to the loss in construction spending and (offsetting) increase in regulatory compliance spending. Under both options, the stimulus adds more jobs than the loss of output takes away, with the result that net employment change from construction impacts is a positive number. In the single-family sector, for example, under Option 1 there is a loss \$12.8 million of output but an offsetting stimulus of \$21.5 million. The loss represents 475 jobs, but the stimulus generates 797 jobs; the net result is that 322 more jobs are generated. Note that these job estimates apply to the entire economy, not just the construction sectors. They represent all of the impacts that result as changes in the construction industry ripple through other sectors.

The stimulus to the construction industry comes at the expense of consumer spending, as home buyers and other consumers devote more of their income to housing. EPA assumes that this loss of consumer surplus takes the form of reduced spending for other products, though it might also take the form of reduced amenities in housing construction. Removing this spending from the national economy reduces the employment that arises in response to consumer spending. The “Change in Employment From Consumer Spending” column shows this reduction in jobs, which offsets the stimulus to construction. When this effect is factored in, the net change in total employment is negative.

Total employment losses range from 0 to 1,400 jobs. These estimates do not consider how long individuals may be out of work, nor do they consider individuals’ alternative opportunities. Because of this, such input-output analysis results are usually considered an over-estimate of the hardship initiated by the change to the economy.

Table 5-18. Changes in Output and Total Employment From the Baseline
(All dollar Values Are in Constant, Pre-tax, 1997 Dollars)

Option	Loss of Output (\$ Million)	Stimulus From Added Work (\$ Million)	Change in Employment From Lost Output (Jobs)	Change in Employment From Stimulus (Jobs)	Net Change in Employment From Construction Impacts (Jobs)	Change in Employment From Consumer Spending (Jobs)	Net Change in Total Employment (Jobs)
Single-Family Residential							
1	(\$12.8)	\$21.5	(475)	797	322	(498)	(176)
2	(\$71.6)	\$120.2	(2,662)	4,467	1,805	(2,792)	(986)
3	\$0.0	\$0.0	0	0	0	0	0
Multifamily Residential							
1	(\$0.9)	\$2.5	(34)	91	57	(67)	(10)
2	(\$5.2)	\$13.7	(192)	509	317	(374)	(56)
3	\$0.0	\$0.0		0	0	0	0
Commercial							
1	(\$14.7)	\$42.6	(546)	1,583	1,037	(1,062)	(25)
2	(\$67.1)	\$194.7	(2,494)	7,234	4,740	(4,857)	(116)
3	\$0.0	\$0.0	0	0	0	0	0
Industrial							
1	(\$4.4)	\$6.7	(164)	248	84	(152)	(68)
2	(\$17.8)	\$26.9	(662)	1,001	338	(616)	(277)
3	\$0.0	\$0.0	0	0	0	0	0
Total							
1	(\$32.8)	\$73.2	(1,219)	2,719	1,501	(1,780)	(279)
2	(\$161.7)	\$355.5	(6,010)	13,212	7,201	(8,638)	(1,436)
3	\$0.0	\$0.0	0	0	0	0	0

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.7.4 Changes in Welfare Measures

As discussed in Section 4.6, the proposed regulation shifts the supply curves for new construction in each sector. This shift alters the balance between consumers and producers. Each group contributes to the costs of complying with the regulation. As Table 5-19 indicates, consumers may lose

from \$0 to \$316.6 million, depending on the option selected. Producers lose from \$0 to \$40.4 million. Almost all of this loss is shifted from consumers and construction firm owners to construction firms to pay the costs of complying with the regulation. As shown in the last section, the net effect on construction may be a stimulus. However, a small portion is utterly lost to society. This portion, termed the “deadweight loss,” ranges from \$0 to \$200,000.

**Table 5-19. Changes in Social Welfare Measures—All Sectors Combined
(All Dollar Values Are in Constant, Pre-tax, 1997 Dollars)**

Option	Total Deadweight Loss (\$ Million)	Total Consumer Surplus Loss (\$ Million)	Total Producer Surplus Loss (\$ Million)
1	\$0.0	\$65.2	\$8.2
2	\$0.2	\$316.6	\$40.4
3	\$0.0	\$0.0	\$0.0

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.7.5 Regional Effects

The multifamily housing and non-residential market models estimate impacts at the state level based on information about local real estate markets. The single-family housing market model estimates market effects at the MSA level, which can then be aggregated to the state level. Table 5-20 shows the loss in output to the construction industry, by state, from compliance with the more expensive Option 2. Loss of output largely follows the expected pattern of population and growth. Several states show zero loss for some categories because there is so little activity in that state that the effect could not be measured. For example, multifamily housing in Vermont. California, Pennsylvania, and several other states (indicated with an e) show no effect as current State regulations were deemed equivalent to the proposed regulations and so there was no incremental impact on firms operating in those states. Although the totals would be lower for Option 1, the pattern of losses would be similar.

Table 5-21 provides a similar state-by-state breakdown of the net change in employment as a result of compliance with the proposed regulation. In several states, multifamily housing, commercial,

and industrial stimulus effects are greater than the losses, and the regulation causes a small net positive change in employment within those categories.

Table 5-20. Loss of Output to the Construction Industry by State and Use Category (\$ Millions) (All Dollar Values Are in Constant, Pre-tax, 1997 Dollars), Option 2

State	Single-Family	Multifamily	Commercial	Industrial
Alabama	(1.2)	0.0	(0.9)	(0.4)
Alaska	(0.2)	0.0	0.0	0.0
Arizona	e	e	e	e
Arkansas	(0.4)	0.0	(0.7)	(0.2)
California	e	e	e	e
Colorado	(3.6)	(0.3)	(1.2)	(0.5)
Connecticut	e	e	e	e
Delaware	(0.3)	0.0	(0.5)	0.0
District of Columbia	(4.8)	(0.2)	0.0	0.0
Florida	(7.4)	(1.0)	(15.3)	(0.9)
Georgia	(0.9)	(0.5)	(4.1)	(1.6)
Hawaii	(0.4)	0.0	0.0	0.0
Idaho	e	e	e	e
Illinois	e	e	e	e
Indiana	(3.6)	(0.1)	(1.6)	(1.5)
Iowa	(0.7)	0.0	(0.7)	(1.0)
Kansas	(0.5)	0.0	(0.9)	(0.5)
Kentucky	(1.1)	0.0	(1.3)	(0.8)
Louisiana	(1.8)	0.0	(1.8)	(0.2)
Maine	0.0	0.0	(2.4)	(0.1)
Maryland	(2.1)	0.0	(2.1)	(0.3)
Massachusetts	e	e	e	e
Michigan	(5.9)	(0.1)	(2.9)	(1.1)
Minnesota	(3.5)	(0.1)	(2.4)	(1.0)
Mississippi	(0.7)	0.0	(0.7)	(0.2)
Missouri	(3.1)	(0.1)	(2.0)	(0.6)
Montana	0.0	0.0	(0.3)	(0.1)
Nebraska	(0.6)	(0.1)	(0.8)	(0.2)
Nevada	4.0	(0.3)	(2.8)	(0.3)
New Hampshire	e	e	e	e
New Jersey	(3.9)	(0.1)	0.0	(0.1)
New Mexico	e	e	e	e
New York	(13.4)	(0.7)	(6.9)	(0.6)
		(0.4)	(3.3)	(1.5)

Table 5-20. Loss of Output to the Construction Industry by State and Use Category (\$ Millions) (All Dollar Values Are in Constant, Pre-tax, 1997 Dollars), Option 2

State	Single-Family	Multifamily	Commercial	Industrial
North Dakota	(0.1)	0.0	(0.3)	(0.3)
Ohio	(6.8)	(0.2)	(1.1)	(1.2)
Oklahoma	e	e	e	e
Oregon	(1.0)	(0.1)	(2.2)	(0.8)
Pennsylvania	e	e	e	e
Rhode Island	(0.7)	0.0	(1.2)	0.0
South Carolina	e	e	e	e
South Dakota	e	e	e	e
Tennessee	e	e	e	e
Texas	e	e	e	e
Utah	e	e	e	e
Vermont	(0.1)	0.0	(1.2)	(0.1)
Virginia	e	e	e	e
Washington	(1.9)	(0.3)	(4.1)	(0.5)
West Virginia	e	e	e	e
Wisconsin	(1.8)	(0.2)	(1.2)	(1.3)
Wyoming	0.0	0.0	(0.2)	0.0
		(5.2)	(67.1)	(17.8)

Note: e indicates state has regulations equivalent to the proposed options.

Source: EPA estimates based on the methodologies presented in Chapter Four.

Table 5-21. Net Change in Total Employment by State and Use Category (Jobs) Under Proposed Rule Option 2

State	Single-Family	Multifamily	Commercial	Industrial
Alabama	(17)	0	(3)	(5)
Alaska	(3)	0	0	0
Arizona	e	e	e	e
Arkansas	(5)	0	(8)	(3)
California	e	e	e	e
Colorado	(50)	(3)	(4)	(4)
Connecticut	e	e	e	e
Delaware	(4)	0	(2)	0
District of Columbia	(66)	(3)	0	0
Florida	(102)	(16)	(15)	(15)
Georgia	(12)	(9)	(28)	(28)
Hawaii	(5)	0	0	0
Idaho	e	e	e	e
Illinois	e	e	e	e
Indiana	(50)	(1)	49	(30)
Iowa	(10)	0	(-3)	(23)
Kansas	(7)	0	(3)	(8)
Kentucky	(16)	(1)	(5)	(13)
Louisiana	(24)	0	(21)	(3)
Maine	0	0	(37)	0
Maryland	(28)	0	(7)	(4)
Massachusetts	e	e	e	e
Michigan	(81)	0	57	(9)
Minnesota	(49)	(1)	(8)	(17)
Mississippi	(10)	0	(3)	(3)
Missouri	(43)	(1)	(7)	(9)
Montana	0	0	(3)	(1)
Nebraska	(8)	(1)	(3)	(3)
Nevada	55	(7)	(44)	(4)
New Hampshire	e	e	e	e
New Jersey	(54)	0	24	1
New Mexico	e	e	e	e
New York	(184)	5	56	(2)
North Carolina	(44)	(7)	(12)	(29)
North Dakota	(1)	0	(1)	(5)
Ohio	(93)	(1)	34	(21)
Oklahoma	e	e	e	e
		(2)	(28)	(11)

Table 5-21. Net Change in Total Employment by State and Use Category (Jobs) Under Proposed Rule Option 2

State	Single-Family	Multifamily	Commercial	Industrial	Total
Pennsylvania	e	e	e	e	e
Rhode Island	(9)	0	(19)	0	(28)
South Carolina	e	e	e	e	e
South Dakota	e	e	e	e	e
Tennessee	e	e	e	e	e
Texas	e	e	e	e	e
Utah	e	e	e	e	e
Vermont	(2)	0	(18)	0	(21)
Virginia	e	e	e	e	e
Washington	(26)	(4)	(64)	(5)	(99)
West Virginia	e	e	e	e	e
Wisconsin	(25)	(3)	37	(20)	(10)
Wyoming	0	0	(3)	(1)	(3)
United States Total	(986)	(56)	(116)	(277)	(1,436)

Source: EPA estimates based on the methodologies presented in Chapter Four.

5.8 IMPACTS ON GOVERNMENTAL UNITS

As Section 4.8 discusses, EPA estimates that the proposed rule would impose some costs on governmental units involved in “codifying” the construction general permit. This section examines the costs imposed on governmental units associated with the proposed Option 2.

5.8.1 Construction Program Administration

EPA has analyzed the costs to governments under the assumption that the majority of construction-related regulatory costs would be associated with processing general permits. As noted previously, EPA assumes that the majority of NPDES Phase I and Phase II NPDES storm water permit programs are fully implemented, and that any new regulatory requirements would be superimposed upon these programs.

Based on the assumption that all states would change their storm water programs to include certification of sedimentation basins and other aspects of the proposed rule, EPA estimated the annual costs of establishing such a program. These costs are presented in Table 5-22. EPA estimates that states would experience \$0.26 million in costs staying current with federal guidance, state guidance, and evolving industry practice (U.S. EPA 2002).

Table 5-22. Costs To Establish Construction Programs (\$1997)

Element	Value	Units
Labor hours to review EPA regulation and modify state practices	200	Hours/Year
Labor cost	\$26.02	\$/Hour/State
State Cost per year	\$5,203	\$/Year/State
Number of States	50	States
Totals	\$260,150	\$/Year

Source: U.S. EPA. 2002.

In evaluating the annual costs, EPA assumed that the current trend — states taking the lead in implementing the regulation of construction activities — will continue in the future. EPA elected not to evaluate how to distribute its total estimated implementation cost between state and municipal agencies, and instead has attributed all costs to states.

5.8.2 Government Construction Costs

Government entities commission nearly a quarter of the value of construction put in place (Census, 2000). Government projects would need to comply with the proposed regulation so their costs would increase, just as private projects' would. Roughly one-half of government projects are maintenance or reconstruction of existing structures which does not entail new ground disturbance. EPA estimates that approximately 25 percent of total impacts would fall on government projects resulting in a \$29.2 million additional cost to government entities under proposed Option 1 or a \$115.9 million

additional cost under proposed Option 2.⁴ This effect is discussed in detail in the Unfunded Mandates Reform Act (UMRA) analysis in Chapter Ten.

5.9 OTHER IMPACTS

This section addresses Executive Order (EO) 12866, which directs federal agencies to assess the costs and benefits of each significant rule they propose or promulgate, as well as issues of environmental justice and children's health. Chapter Ten addresses the Unfunded Mandates Reform Act (UMRA). Section 5.9.1 describes the administrative requirements of EO 12866. Sections 5.9.2 and 5.9.3 describe EPA's analysis of environmental justice and children's health issues for the proposed rule. Another piece of legislation —the Unfunded Mandates Reform Act, or UMRA —also has requirements relevant to EPA's plans. Chapter Ten addresses UMRA.

Much of the information provided in this section is summarized from other documents that support this proposed rulemaking, as well as other sections of this report.

5.9.1 Requirements of Executive Order 12866

Under EO 12866 (58 FR 51735, October 4, 1993), the Agency is to determine whether a regulatory action is "significant" and therefore subject to OMB review and the directives of the EO. The Order defines a "significant regulatory action" as one that is likely to result in a rule that may:

- (1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities;
- (2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

⁴ Additional cost to government entities under the proposed ESC options includes costs potentially incurred by Federal, State, and local government entities.

- (3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- (4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

EPA has determined that the proposed C&D rulemaking is a "significant regulatory action" under the terms of EO 12866, because the total costs of the proposed rule are estimated to exceed \$100 million annually. As such, this action was submitted to OMB for review. Changes made in response to OMB suggestions or recommendations will be documented in the public record.

In addition to submission of the action to OMB, the principal directives of the EO are that the Agency perform an analysis comparing the benefits of the regulation to the costs that the regulation imposes, that the Agency analyze alternative approaches to the proposed rule, and that the reason for the proposed rule be identified. Wherever possible, the costs and benefits of the proposed rule are to be expressed in monetary terms. To address these directives, the following section describes the reasons why EPA is revising the existing regulations, and Chapters Eight and Nine present the estimated social costs, pollutant reductions, and monetary benefits of the proposed C&D regulations. Section 5.8 addresses the impacts of the proposed regulations on governmental units. An in-depth profile of the potentially affected industry sectors is presented in Chapter Two of this report.

Reason for the Regulation

Executive Order 12866 directs the Agency to identify the reason for the regulations being proposed. The reasons for proposing the C&D regulations are stated throughout this report (Chapters One and Six) and are presented in the preamble of the proposed rulemaking. These reasons are summarized briefly below:

- In spite of existing regulatory controls, there is continued runoff of sediment from construction sites and newly developed areas. Sediment entering public waterways imposes costs on water users in the form of additional demand for pre-treatment of water withdrawn and diminished value for in-stream uses. Users cannot identify and seek compensation from the construction sites causing the problem. So there is a market failure in terms of the environmental externality of sediment emissions. The proposed

regulations are expected to address the impairment of many U.S. waterways and the associated human health and ecological risks.

- The existing regulation appears to be insufficient to protect or restore water quality. There exists an information asymmetry between builders and enforcement officials in which builders know their level of care with regard to erosion and sediment controls while officials may or may not know. The certification and inspection provisions of the proposed rule increase the level of information available to officials. The revisions would make the regulations apply more uniformly throughout the country and “raise the bar” for storm water control, in general.

Both UMRA and EO 12866 require the statutory authority for the rule to be cited. A detailed discussion of the objectives and legal basis for the proposed C&D regulations is presented in the preamble. A discussion of the UMRA is presented in Chapter Ten of this report.

5.9.2 Environmental Justice

According to EO 12898, *Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*, federal agencies are to address potential environmental justice issues that may be triggered by proposed actions. Based on guidance in EPA’s *Guidelines for Preparing Economic Analyses*, the potential effects of the proposed regulation on minority and low-income populations have been considered (U.S. EPA 2000). EPA has determined that the proposed rule would not have a disproportionately large effect on minority or low-income populations, nor would it have disproportionately high human health or environmental effects. Thus no further analysis on environmental justice issues has been conducted for this proposal.

5.9.3 Children’s Health

Pursuant to EO 13045, *Protection of Children From Environmental Health Risks and Safety Risks*, EPA has considered whether this proposed rule would have any significant effects on children’s health or safety (U.S. EPA 2000). EPA has determined, based on the information provided throughout

this report, that the proposed rule would not have any significant effects on children's health or safety, and no further analysis has been conducted for this proposal.

5.10 REFERENCES

Tetra Tech. 2002. Personal Communication from J. Swanson, Tetra Tech, Inc., to J. Cantin, ERG, Inc. January 29.

U.S. Census Bureau 2000.1997 Economic Census: Construction: Subject Series. January.

U.S. EPA 2002. "Development Document for the Effluent Guidelines for the Construction and Development Point Source Category." Washington, D.C.: U.S. Environmental Protection Agency.

U.S. EPA 2000. "Guidelines for Preparing Economic Analyses." Washington, D.C.: U.S. Environmental Protection Agency, Report EPA 240-R-00-003, September.